AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A system comprising:

an integrated circuit on a VLSI die; and

an embedded micro-controller constructed on the VLSI die, the micro-controller adapted to monitor and control the VLSI environment to optimize the integrated circuit operation;

where said micro-controller includes updateable or replaceable firmware, said firmware comprising:

algorithms for determining how to respond to temperature, power, voltage, or clock parameters.

2. (Original) The system of claim 1 wherein the embedded micro-controller monitors one or more of the parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the power supplied to the integrated circuit;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

3. (Original) The system of claim 1 wherein the embedded micro-controller controls at least one of the following parameters:

temperatures at one or more locations on the integrated circuit;

the integrated circuit power supply;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

4. (Original) The system of claim 1 wherein the integrated circuit comprises two or more processor cores, each core having a integer unit and a floating point unit, the micro-controller further comprising:

temperature sensors at each of the integer units and floating point units on each of the cores.

5. (Original) The system of claim 1 further comprising:

embedded ammeters constructed on the VLSI integrated circuit die, the ammeters comprising voltage controlled oscillators.

6. (Original) The system of claim 1 further comprising:

fuses that provide hardware selection of VLSI integrated circuit environment parameters that are monitored by the embedded micro-controller.

7. (Cancelled)

8. (Currently Amended) A method for monitoring and controlling an integrated circuit comprising:

providing an embedded micro-controller on a same VLSI die as the integrated circuit;

where said micro-controller includes updateable or replaceable firmware, said firmware comprising:

algorithms for determining how to respond to temperature, power, voltage, or clock parameters; and

monitoring and controlling a VLSI environment of the integrated circuit with the embedded micro-controller.

9. (Original) The method of claim 8 further comprising:

monitoring, by the embedded micro-controller, one or more integrated circuit

parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the power supplied to the integrated circuit;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

10. (Original) The method of claim 8 further comprising:

controlling, by the embedded micro-controller, one or more processor parameters

selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the integrated circuit power supply;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

11. (Original) The method of claim 8 further comprising:

controlling, using the embedded micro-controller, the VLSI environment to optimize

an integrated circuit operating power level to approach a design limit.

12. (Original) The method of claim 8 further comprising:

monitoring, using the embedded micro-controller, a temperature in a location of the

integrated circuit; and

reducing, using the embedded micro-controller, a power supply voltage in response to

an over-temperature condition in the location.

13. (Original) The method of claim 8 further comprising:

monitoring, using the embedded micro-controller, a temperature in a location of the

integrated circuit; and

reducing, using the embedded micro-controller, a processor operating clock frequency

in response to an over-temperature condition in the integrated circuit.

14. (Original) The method of claim 8 wherein the integrated circuit is a processor, the method further comprising:

monitoring, using the embedded micro-controller, a temperature in a first core of the processor; and

transferring, using the embedded micro-controller, a processing workload from the first core to a second core of the processor.

15. (Original) The method of claim 8 further comprising:

monitoring, using the embedded micro-controller, current levels in the integrated circuit using ammeters comprising one or more voltage controlled oscillators.

16. (Currently Amended) A computer program product comprising a computer usable medium having computer readable program code embedded therein, the computer readable program code comprising:

code for controlling an embedded micro-controller constructed on a VLSI integrated circuit die with a processor, wherein the micro-controller monitors and controls a VLSI environment of the processor; and where said micro-controller includes updateable or replaceable firmware, said firmware comprising algorithms for determining how to respond to temperature, power, voltage, or clock parameters.

17. (Original) The computer program product of claim 16 further comprising:

code for monitoring, by the embedded micro-controller, one or more integrated circuit parameters selected from the group consisting of:

temperatures at one or more location on the integrated circuit;

the power supplied to the integrated circuit;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

18. (Original) The computer program product of claim 16 further comprising:

code for controlling, by the embedded micro-controller, one or more integrated circuit parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the integrated circuit power supply;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

19. (Original) The computer program product of claim 16 further comprising:

code for controlling the VLSI environment to optimize an integrated circuit operating power level to approach a design limit.

20. (Original) The computer program product of claim 16 further comprising:

code for monitoring a temperature in a core of the processor; and

code for reducing a power supply voltage in response to an over-temperature condition in the core.

21. (Original) The computer program product of claim 16 further comprising:

code for monitoring a temperature in a core of the processor; and

code for reducing a processor operating frequency in response to an over-temperature condition in the core.

22. (Original) The computer program product of claim 16 further comprising:

code for monitoring a temperature in a first core of the processor; and

code for transferring a processing workload from the first core to a second core of the processor.

23. (Original) The computer program product of claim 16 further comprising:

code for monitoring current levels in the integrated circuits using ammeters comprising one or more voltage controlled oscillators.

24. (Currently Amended) A system for monitoring and controlling an integrated circuit comprising:

means for providing an embedded micro-controller on a same VLSI die as the integrated circuit;

where said micro-controller includes updateable or replaceable firmware, said firmware comprising:

algorithms for determining how to respond to temperature, power, voltage, or clock parameters; and

means for monitoring and controlling a VLSI environment of the integrated circuit with the embedded micro-controller.

25. (Original) The system of claim 24 further comprising:

means for controlling, using the embedded micro-controller, the VLSI environment to optimize an integrated circuit operating power level to approach a design limit.

26. (Original) The system of claim 24 further comprising:

means for monitoring, using the embedded micro-controller, a temperature in a location of the integrated circuit; and

means for reducing, using the embedded micro-controller, a power supply voltage in response to an over-temperature condition in the location.

27. (Original) The system of claim 24 further comprising:

means for monitoring, using the embedded micro-controller, a temperature in a location of the integrated circuit; and

means for reducing, using the embedded micro-controller, a processor operating clock frequency in response to an over-temperature condition in the integrated circuit.

28. (Original) The system of claim 24 wherein the integrated circuit is a processor, the method further comprising:

means for monitoring, using the embedded micro-controller, a temperature in a first core of the processor; and

means for transferring, using the embedded micro-controller, a processing workload from the first core to a second core of the processor.